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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,175	05/23/2001	Matthias Kehder	01-203	9628

7590 08/16/2004

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EXAMINER

HIRL, JOSEPH P

ART UNIT

PAPER NUMBER

2121

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/863,175

Applicant(s)

KEHDER ET AL.

Examiner

Joseph P. Hirl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT entered May 21, 2004 for the patent application 09/863,175 filed on May 23, 2001.
2. The First Office Action of November 13, 2003 is fully incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 1-48 are pending.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 1-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims recite the intention of developing a predictive model. Such a predictive

model is based on the premise of at least one independent variable that identifies a single dependent variable. The detailed description of the preferred embodiments, (specification, page 9 through page 34 including the related drawings) identifies coding and Fig. 6 illustrates a system configuration but the details involving how one steps from the chromosomes to a fully descriptive model are not identified in an integrated manner and such step is non trivial. Specifically, if the model is to be of the form $y = \tan^{-1} (k_1 x_1^{2.475}) + k_2 x_2^{34.475} + k_3 x_3^{247.5} + \text{abs}(k_4 x_4^{3.656}) + k_4$ where k_i are constants, x_i are independent variables and y is the dependent variable, the full process identification which includes all elements of functionality and integration has not been disclosed such that one of ordinary skill in the art could replicate the invention without undue experimentation.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-5, 34 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Michalewicz et al (ACM 0001-0782, referred to as Michalewicz).

Claims 1, 34

Michalewicz anticipates (a) providing a dataset containing a plurality of observations each containing a value for said dependent variable and values for said at least one independent variable (**Michalewicz**, p 2, l 30, 31); (b) creating from said

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dataset of an initial generation of chromosomes each comprising a predictive model (**Michalewicz**, p 2, l 31); (c) determining a quantitative fitness measure for each chromosome in said initial generation (**Michalewicz**, p2, l 32); and (d) creating a next generation of chromosomes by selecting a number of chromosomes from said initial generation, crossing said selected chromosomes by at least one of a cloning and a crossover technique, and mutating said chromosomes (**Michalewicz**, p2, l 33).

Claim 2

Michalewicz anticipates (e) determining new fitness measures for said chromosomes in said next generation, and (f) repeating said selecting, crossing and mutating steps to create a successive generation of chromosomes (**Michalewicz**, p2, l 16-20).

Claim 3

Michalewicz anticipates continuously repeating steps (e) and (f) for said successive generation of chromosomes to create another successive generation of chromosomes (**Michalewicz**, p2, l 16-20).

Claim 4

Michalewicz anticipates said initial generation chromosome creating step is performed using a random method (**Michalewicz**, p7, l 29-31).

Claim 5

Michalewicz anticipates initial generation chromosome creating step is performed using a distributed method (**Michalewicz**, p7, l 29-31; Examiner's Note (EN): para 2 applies; to one of ordinary skill in the art, a distributed process is random).

Claim 41

Michalewicz anticipates a chromosome for predicting a model comprising a plurality of observed variable segments (**Michalewicz**, p1, l 30), a plurality of interaction segments (**Michalewicz**, p1, l 31) and an intercept gene (**Michalewicz**, p2, l 26-27; EN: para 2 applies; the intercept gene and a mutation gene are synonymous).

Examination Considerations

7. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

8. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are

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entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

9. Examiner's Opinion

Paras 7. and 8. apply. The claims must be carefully written to bring forth the features of the specification. Much has been done in the field of genetic algorithms. The specification, as evidenced by the lengthy discussion in the applicant's response of May 21, 2004, raises serious questions concerning enablement. The substance of the discussion related to 35 USC 112, first paragraph, relates to new matter.

Response to Arguments

10. The rejection of claims 1-48 under 35 USC112, first paragraph, remains. Applicant's arguments on pages 2 through 7 of the Applicant's response dated May 21, 2004 (A052104) makes the Examiners point. Simply, one of ordinary skill in the art would not be able to implement the disclosed invention without undue experimentation. Applicant's statement on page 2, lines 19-23, identifies the issue albeit not understood by one of ordinary skill in the art. The issue regarding the model identified by the Examiner on page 3 of the First Office action has not been answered.

11. In a detailed review of A052104, the following comments pertain to 35 USC 112, first paragraph, regarding enablement:

A052104, page 2, lines 24-30: if the same "genes" make up the variable segments as do the interaction segments, what is the difference between the variable segments and the interaction segments? Since both are segments, is variable and interaction synonymous? And if so, why is there a differentiation?

A052104, page 2, line 31: what are the characteristics of continuity for the variable? Items (1), (2), (3) and (4) do not appear to be continuous.

A052104, page 3, lines 6-9: how is the Boolean selection logic continuous? It would appear to be discontinuous at its decision points.

A052104, page 3, lines 6-9: Fig. 3 identifies the characteristics from median to observed maximum. There is no description for the median to minimum. How does one set the maximum of the outlier gene? What does the; outlier gene look like on the minimum side? Is there a minimum outlier gene?

A052104, page 3, lines 20-27: "Some number of bits represent the exponent to use in the power transformation." This is a "whatever" statement that creates indefiniteness. If the base is binary and the power is -2 to +2, the decimal values are .25 to 4? This does not seem to fit the table at the top of page 4.

A052104, page 4, table at top: what is the exponent column all about and how does one move from the exponent column to the transformation column? What does the "-2" mean in the exponent column? How was $\log(x)$ established for binary 100?

A052104, page 4, table at top: there is no discussion of the how and why of the subject table.

A052104, page 4, lines 1-3: how is the outlier trimming done on the minimum side? What criteria is used to establish the minimum of the maximum outlier?

A052104, page 4, lines 5-9: from the above table, $\log(x)$ is part of the transformation. How does one apply the log function to a negative number?

A052104, page 4, lines 9-10: line 9 identifies 8bits and the binary number shown on line 10 has only 7 bits?

A052104, page 4, lines 17-18: how does one determine the min from the max?... and on what side?

A052104, page 4, lines 19-23: if each variable has 15 bits, why does each variable listed at the bottom of page 4 have 20 bits?

A052104, page 5, line 3: from the previous page, it would appear that the chromosome should consist of 45 bits. Why does the chromosome have 60 bits?

A052104, page 5, line 3: what is the coding order of the bits?

A052104, page 5, line 3: what was the determining factor to exclude VAR1? If such variable has been excluded, why isn't the chromosome of length 30 bits?

A052104, page 5, lines 1-15: what was the rationale behind setting the values of the trim factors?

A052104, page 5, lines 1-30: the algorithm regarding VAR2 and VAR3 cites a process and values that do not formulate closure on a unique solution and therefore establish a process of indefiniteness.

A052104, page 6, lines 6-13: why isn't the model of some other form? What makes this form appropriate?

A052104, page 7, line 6: what does this mean? Ist is 0 of what? Op is operation concerning what types of operation?

The examiner, having reviewed the pages 3 through 7 of A052104 is of the opinion that the proposed invention is merely a coding scheme much like a computer language and there is no intrinsic value proposed by a unique algorithm that provides a benefit that advances the state of the art.

12. Applicant's arguments filed on May 21, 2004 related to Claims 1-48 have been fully considered but are not persuasive.

In reference to Applicant's argument:

With regard to the anticipation rejection of claims 1 - 5, 34, and 41 over the Michalewicz, while the cited reference uses a genetic algorithm to generate an equation to solve for a dependent variable based on the values of at least one independent variable, it does not: anticipate using a genetic algorithm to generate a predictive model. A predictive model, while it can take the form of an equation, is more complex than the mathematical equation that Michalewicz hopes to create. In the creation of a predictive model, the selection of which independent variables to use is as important as determining the value of the coefficients in the equation. In the instant application, a genetic algorithm is used to determine which variables from a data set should be used. Additionally, the transformation and manipulations that can be applied to an independent variable such as Outlier trimming and variable transformation are part of a predictive model. Further, creating interaction terms between independent variables that could be used in the predictive mode in addition to using independent variables by themselves is needed. All of these features, variable selection and data preparation are parts of the predicative model that is created by the present invention. They are not however part of the equation Michalewicz generates.

Examiner's response:

Para 9. applies. The claims and only the claims form the metes and bound of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Claims 1-5, 34 and 41 were specifically related to the prior art of

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Michalewicz in the First Office Action. Michalewicz is genetic algorithmic based and certainly cites the use of variables. It is axiomatic that models are used for prediction.

In reference to Applicant's argument:

With regard to claim 1, it is allowable because Michalewicz does not perform each of the steps set out therein. In particular, Michalewicz does not perform the step of creating from said database of an initial generation of chromosomes each comprises a predictive model.

Examiner's response:

Para 9. applies. First Office Action referenced Michalewicz @ page 2, line 31.

In reference to Applicant's argument:

Michalewicz does not determine the new fitness measures and repeats steps (e) and (f) in combination with the other claimed steps.

Examiner's response:

Para 9. applies. First Office Action applies.

In reference to Applicant's argument:

With regard to claim 4, the random method for creating an initial generation for chromosomes that is implemented by the present invention is different from the Michalewicz method. In the present invention, values are randomly assigned to genes within each observed variable segment. Michalewicz does not anticipate randomly assigning values of Boolean type such as used in the present invention in an include/exclude gene or the other types of values assigned to other genes such as outlier, contrast, transformation, and interaction genes. It is submitted that Michalewicz does not teach or suggest the initial generation chromosome creating step of the present invention.

Examiner's response:

Para 9. applies. The claims and only the claims form the metes and bound of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. First Office Action applies. Distributions have random features.

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In reference to Applicant's argument:

With regard to claim 5, the distributed method for creating an initial generation for chromosomes is not random and differs from what is described in the Michalewicz method. As described in the specification, a process is used by which the initial population is generated. Because a clearly defined process is used to generate the distributed population, it is not random and thus, the process differs from Michalewicz's. The instant process creates two chromosomes for each observed variable where only one independent variable is used in the predictive model. The first of the two chromosomes has a positive coefficient for the only variable in the model while the second has a negative coefficient. Michalewicz's distributed process selects points from the boundary of the solution space, and will use every variable in the equation.

Examiner's response:

Para 9. applies. The claims and only the claims form the metes and bound of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. First Office Action applies.

In reference to Applicant's argument:

With regard to claim 41, Michalewicz does not anticipate using a chromosome to represent an equation for numerical optimization problem and for representing a predictive model. A predictive model contains a plurality of observed variable segments each of which contains several genes. One of the genes which is included in a variable segment is an include/exclude gene which determines if this variable should be included in the predictive model. Michalewicz does not allow the genetic algorithm to determine which variables are used in his equation nor having the chromosome include a representation of this decision. Other genes that may be included are outlier trimming and transformation genes which modify the data being input into the predictive model. Michalewicz does not allow the genetic algorithm to alter the data being input into his equation nor having the chromosome include a representation of these alterations. Michalewicz does not allow both continuous (numerical) and categorical (character) data to be input into his equation, but only allows numeral data to be input into the equations. A plurality of interaction segments is also included in a predictive model. An interactive segment is used if two observed variables have predicative value when used together and does not simply represent the substitution of a variable with an independent equation such as that used by Michalewicz. The elements set forth in claim 41 can not be found in Michalewicz.

Examiner's response:

Para 9. applies. The claims and only the claims form the metes and bound of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. First Office Action applies. Such description as identified above is simply not contained in the subject claim.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Claims 1-48 are rejected.

Correspondence Information

15. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anthony Knight can be reached at (703) 308-3179.

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Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

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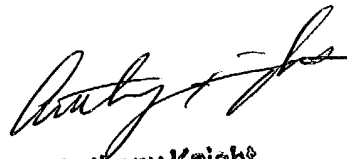
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"Proposed" or "Draft" for the desk of the Examiner).



Joseph P. Hirl

August 10, 2004



Anthony Knight
Supervisory Patent Examiner
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